State of Asthma Hawaii 2004




Hawaii State
Asthma Control Program

Acknowledgements

The Hawaii State Asthma Control Program would like to acknowledge the following organizations who contributed to the State of Asthma – Hawaii 2004.

Hawaii State Department of Health
- Director's Office
- Community Health Division
- Chronic Disease Management and Control Branch
- Office of Health Status Monitoring
- Office of Health Planning, Behavioral Risk Factor Surveillance System

Hawaii Health Information Corporation

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A Message from the Director of Health

Aloha Kakou,

The Hawaii Department of Health is pleased to present the publication of the State of Asthma – Hawaii 2004. The report, produced under the direction of the Hawaii State Asthma Control Program, compiles surveillance information, and other data sources into a comprehensive document.

Asthma is a complex disease that is increasing in prevalence in the United States. Data from the 2002 Hawaii Behavioral Risk Factor Surveillance System (BRFSS) survey show that approximately 9.7% or 28,600 children, and 6.9% or 64,000 adults currently have asthma in Hawaii. Healthcare costs associated with asthma are sobering. According to the Hawaii Health Information Corporation, total charges associated with hospitalizations due to a primary diagnosis of asthma amounted to more than $14 million in 2002 alone. This does not include healthcare costs associated with asthma-related outpatient and emergency department visits or prescription medications.

It is clear that the burden of asthma on Hawaii's residents is significant. The public health response to this increasing burden of asthma has several key components, surveillance being the first. Surveillance allows us to quantify how much asthma exists in the population, how severe it is, how well it is being controlled, and how much it costs. Sound data will allow us to make sound decisions when developing asthma programs.

The "State of Asthma – Hawaii 2004" report is a compilation of surveillance data specific to Hawaii's residents. This report is intended to provide organizations with timely and relevant information necessary for targeted asthma-related program planning.

Asthma is a serious, common, and costly disease, but by working together, we can create a healthier Hawaii. I invite you to join us in that effort.

Kuikahi Kakou i ka puuwai,
let us all work together from the heart,
Chiyome Leinaala Fukino, M.D.
Director
Hawaii State Department of Health

Pictured from left to right: Robert Hirokawa, Sandi Chang, Virginia Ishitani, Gregg Kishaba

A Message from the Hawaii State Asthma Control Program

Aloha,

The Hawaii State Asthma Control Program is pleased to announce the release of the "State of Asthma – Hawaii 2004."

This report is a compilation of data on asthma in Hawaii. The document presents the most recent information available on the current and lifetime prevalence of asthma, hospitalizations, health status, health/lifestyle behavior, and mortality.

We hope this document will provide you or your organization with an increased understanding of asthma-related data and its application to program planning.

For more information on the State of Asthma – Hawaii 2004 or to receive additional copies, please contact the Hawaii State Asthma Control Program at 808-692-7472 or by e-mail at asthma@mail.health.state.hi.us

Mahalo,

Hawaii State Asthma Control Program
Gregg Kishaba, Asthma Program Coordinator
Robert Hirokawa, Asthma Program Epidemiologist
Virginia Ishitani, Asthma Program Clerk
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Asthma Surveillance Introduction

The Centers for Disease Control and Prevention (CDC) describes public health surveillance as the ongoing, systematic collection, analysis, interpretation, and dissemination of data regarding a health-related event for use in public health action to reduce morbidity and mortality and to improve health (1-3). Data from a public health surveillance system can be used for immediate public health action, program planning and evaluation, formulating research hypotheses and used to:

- Measure the burden of a disease (or other health-related event), including changes in related factors, the identification of populations at high risk, and the identification of new or emerging health concerns;
- Monitor trends in the burden of a disease (or other health-related event), including the detection of epidemics (outbreaks) and pandemics;
- Guide the planning, implementation, and evaluation of programs to prevent and control disease, injury, or adverse exposure;
- Evaluate public policy;
- Detect changes in health practices and the effects of these changes;
- Prioritize the allocation of health resources;
- Describe the clinical course of disease; and
- Provide a basis for epidemiologic research.

It is clear that the existence of a functioning and sustainable asthma surveillance system is vital for efficient planning, evaluation, and program action. As such, the Hawaii State Asthma Control Program (HSACP) is currently engaged in the construction of Hawaii's Comprehensive State Asthma Surveillance System (CSASS) that will be designed to measure and track asthma burden through four key indicators: (1) asthma prevalence, (2) asthma severity, (3) asthma management, and (4) asthma cost. Although Hawaii's Comprehensive State Asthma Surveillance System is still under construction, meaningful asthma surveillance data is currently available for public dissemination. This report details the current state of asthma burden in Hawaii utilizing several existing data sources: the Behavioral Risk Factor Surveillance System (BRFSS), vital statistics, and hospital discharge data. It is hoped that the information contained in this report will help guide, focus, and target asthma programs throughout Hawaii.

The information presented in this report is based on these data sources: (1) Hawaii Behavioral Risk Factor Surveillance System (BRFSS) data for 2002, (2) asthma hospitalization data (0 –19 years of age) from the Hawaii Health Information Corporation (HHIC) for the years 1996 to 2001, (3) mortality data from Hawaii vital statistics records for the years 1991 to 2002, and (4) the Centers for Disease Control and Prevention's (CDC) web publications.

Behavioral Risk Factor Surveillance System

The Behavioral Risk Factor Surveillance System (BRFSS) is the largest continuously conducted telephone health survey in the world. The BRFSS is conducted by the Hawaii Department of Health in collaboration with the CDC. Hawaii has been an active participant in the BRFSS since the early nineties. The BRFSS enables the CDC, state health departments, and other health and education agencies to monitor risk behaviors related to chronic diseases, injuries and death. State health departments use BRFSS data to create annual and periodic reports, fact sheets, press releases, or other publications, which are used to educate the public, the professional health community, and policy makers about the prevalence of modifiable behavioral risk factors and of preventive health screening practices. Data collected through the BRFSS is routinely used to capture health information on demographically defined subgroups (gender, ethnicity, age, educational level, income level, geographic location).

Confidence Interval: Confidence intervals have been provided in the BRFSS section of this report as an efficient way to look for differences among subgroups on important health issues, and serves as an important tool when it comes to looking for patterns in BRFSS reports. A confidence interval is a range that contains the true population prevalence estimate with a certain degree of assurance when repeated sampling of the population is performed. The degree of assurance commonly used is 95%. For example, if we set our confidence interval at 95%, then we can expect that 5 out of 100 times the estimates coming from our samples will fall outside the range that contains the true population value. However, 95% of the time our estimates will fall within the correct range. This is known as a 95% confidence interval. Confidence intervals are used to assess if there are differences in prevalence among defined subgroups. It is a quick and simple way to determine if such differences are potentially significant (statistically).

For example, the analysis of current asthma prevalence* by gender shows that females have a higher current asthma prevalence rate when compared with males (9.2% versus 4.5%) and the confidence intervals around these prevalence estimates do not overlap (page 13, figure 11). Based on this finding, it is reasonable to say that "likely significant differences" of current asthma prevalence exist between females and males in this state. However, in order to say that there are statistically significant differences of current asthma prevalence between females and males, a formal test of significance would have to be conducted (e.g., t-test, chi-square test).

(Continued on Page 6)

* **Current Asthma Prevalence** is defined by the Hawaii BRFSS as those who responded "yes" to the Adult Lifetime Asthma Prevalence question, and who responded "yes" to the question, "Do you still have asthma?"

(Continued from Page 5)

Odds Ratio: Odds ratios have also been provided in the BRFSS section of this report as a quick way of comparing whether the probability of a certain event is the same for two groups. An odds ratio of 1 implies that the event is equally likely in both groups. An odds ratio greater than one implies that the event is more likely in the first group. An odds ratio less than one implies that the event is less likely in the first group.

For example, the analysis of immunization rates shows that adults who currently have asthma receive their influenza vaccine at a higher rate (46.8% versus 35.1%) when compared with adults without asthma (Figure 20) with an odds ratio of 1.6 (Appendix VII). This implies that adults with current asthma are approximately 1.6 times more likely to receive their influenza vaccine when compared to adults without asthma.

Hospitalization Data

The Hawaii Health Information Corporation (HHIC) is a private, not-for-profit corporation established in 1994. HHIC maintains one of Hawaii's largest healthcare databases, which contains nearly 1,000,000 inpatient discharge records collected from Hawaii's 22 acute care hospitals for each year since 1993. HHIC's mission is to collect, analyze and disseminate statewide health information to support efforts to continuously improve the quality and cost-efficiency of Hawaii's health care services. Through HHIC's comprehensive database and expert analytical capabilities, organizations are provided with information essential to health care quality management, community assessment, planning and policy analysis, and research.

Mortality Data (Vital Statistics)

The Office of Health Status Monitoring (OHSM) of the Hawaii Department of Health collects, processes, analyzes and disseminates relevant, population-based data in a timely fashion in order to assess the health status of Hawaii's population and to fulfill health statistics legal requirements. The office also provides vital statistics, demographic and health data for use in identifying state and community health trends, identifying population groups at risk for serious health problems and evaluating program effectiveness. Other OHSM activities include: maintaining health surveys for the purpose of collecting data on health conditions not otherwise monitored within the state yet needed to analyze health status; disseminating information through published reports and through visual presentations such as charts, graphs and maps; and coordinating the integration and linkage of departmental databases with external databases. The OHSM also provides a repository for vital event records with the state such as births, deaths and marriages and to provide copies to the general public on a timely basis. OHSM also issues marriage licenses as well as marriage, birth and death certificates.

Highlights of Hawaii's Current Asthma Burden

- Data from the 2002 Hawaii BRFSS survey suggest that 9.7% or 28,600 children, and 6.9% or 64,000 adults currently have asthma in Hawaii.
- Native Hawaiians have a higher current adult asthma prevalence rate when compared with Japanese.
- Adult females have a higher current asthma prevalence rate when compared with adult males.
- The Puna/Kau region has a childhood current asthma prevalence rate of 16.2%, which is significantly higher than the state childhood current asthma prevalence rate of 9.7%.
- Obesity is associated with current asthma in adults.
- Approximately 21% of adults with current asthma smoke. In fact, adults with current asthma smoke at about the same rate as adults without current asthma.
- Adults with current asthma report significantly greater number of days with symptoms of depression and anxiety compared to adults without current asthma.
- Adults with current asthma are more likely to report not getting enough sleep when compared to adults without current asthma.
- Flu shot and pneumococcal pneumonia vaccine rates are higher among adults with current asthma when compared to adults without current asthma; however, these vaccine rates are lower than the Healthy People 2010 goals for high-risk adults.
- Hawaii asthma mortality trends are (asthma as an underlying cause) decreasing (1991-2002), but are still higher than the national average (year 2000).
- Hawaii pediatric hospitalization rates are decreasing, except in the under five age-group. Within the under five age-group, asthma hospitalization rates are higher than the Healthy People 2010 goal.

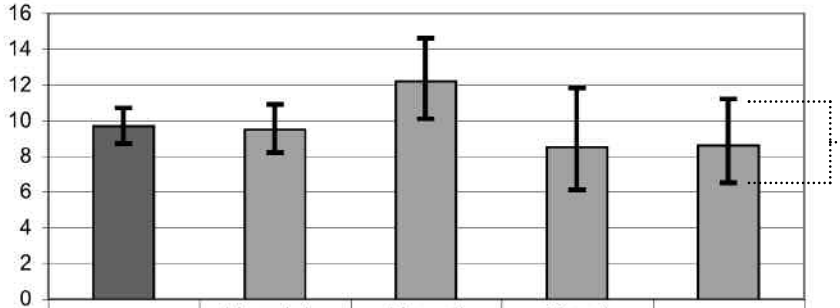
Current Asthma Prevalence – Statewide

Children

Data from the 2002 Hawaii BRFSS phone survey asking about health show that approximately 9.7%, or 28,600 children, ages 0-17, living in Hawaii currently have asthma (Figure 1). The survey also shows that about 14.1%, or 41,600 children living in Hawaii reported having asthma at some point in their lifetime (Appendix II).

Finding:
Figure 1 suggests that children in Hawaii County have a higher prevalence rate of current asthma when compared with the other counties and the state average; however, this finding is not statistically significant (Appendix I).

Figure 1. Percent of children residing in the State of Hawaii and its four counties who currently have asthma, BRFSS, 2002



	State	Honolulu County	Hawaii County	Kauai County	Maui County
% Current Childhood Asthma	9.7	9.5	12.2	8.5	8.6

* A confidence interval is a range that contains the true population prevalence estimate. For a more complete explanation of the confidence interval, please refer to page 5 of this report.

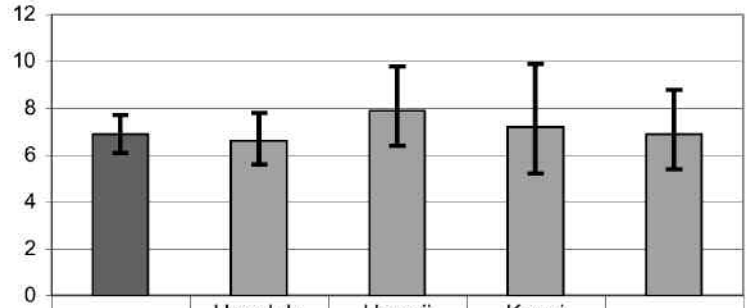
Adults

Data from the 2002 Hawaii BRFSS phone survey asking about health show that approximately 6.9%, or 64,000 adults living in Hawaii currently have asthma (Figure 2). The survey also found that about 13.4%, or 125,000 adults living in Hawaii reported having asthma at some point in their lifetime (Appendix IV).

Finding:
Figure 2 suggests that adults in Hawaii County have a higher prevalence rate of current asthma when compared with the other counties and the state average; however, this finding is not statistically significant (Appendix III).

Overall, Hawaii's adult current prevalence rate (6.9%) is lower than the national average (7.5%) for 2002.

Figure 2. Percent of adults residing in the State of Hawaii and its counties who currently have asthma, BRFSS, 2002



	State	Honolulu County	Hawaii County	Kauai County	Maui County
% Current Adult Asthma	6.9	6.6	7.9	7.2	6.9

Current Asthma Prevalence – Honolulu County

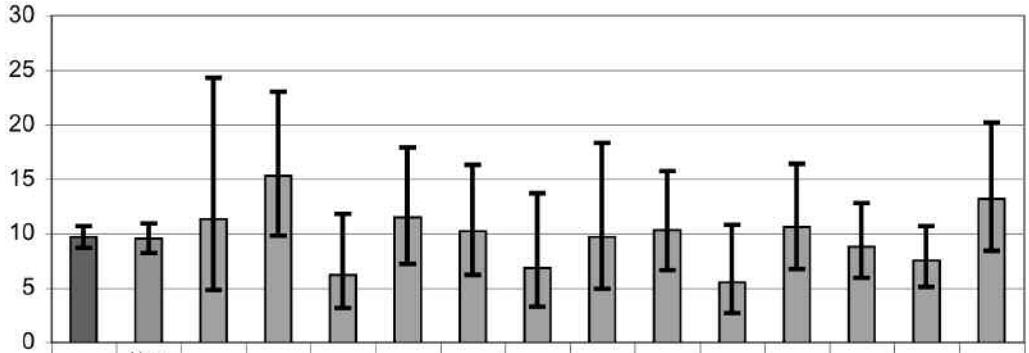
Map Legend:

A. North Shore
B. Kaaawa/Kahaluu/Kaneohe
C. Kailua/Waimanalo
D. Hawaii Kai/Kahala/Waialae
E. Kaimuki/Palolo/Waikiki
F. Upper Makiki/Manoa
G. Lower Makiki/Ala Moana
H. Moanalua/Kalihi/Nuuanu
I. Salt Lake/Foster Village
J. Aiea/Pearl City
K. Mililani/Wahiawa
L. Waipahu/Waipio/Kapolei
M. Nanakuli/Waianae

Children

In Honolulu County, approximately 9.5%, or 19,800 children currently have asthma (Figure 3). Furthermore, about 13.3% or 27,700 children living in Honolulu County reported having asthma at some point in their lifetime (Appendix II).

Figure 3. Percent of children residing in Honolulu County who currently have asthma, BRFSS, 2002



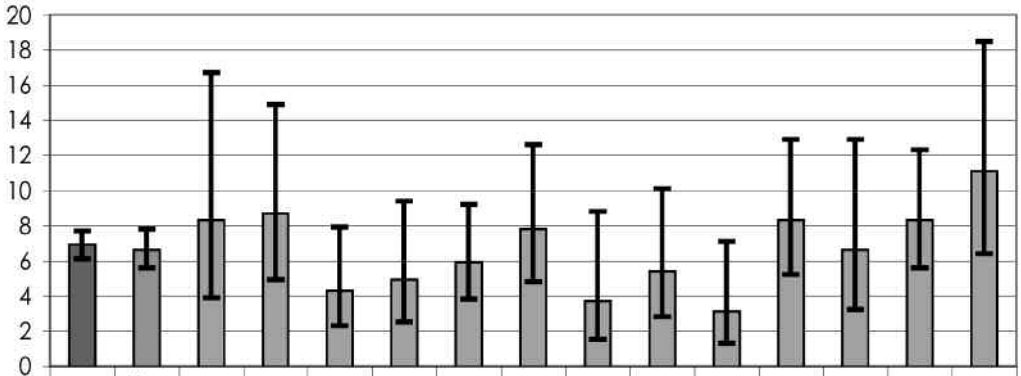
	State	Hon Co.	A	B	C	D	E	F	G	H	I	J	K	L	M
% Current Childhood Asthma	9.7	9.5	11.3	15.3	6.2	11.5	10.2	6.8	9.7	10.3	5.5	10.6	8.8	7.5	13.2

Adults

In Honolulu County, approximately 6.6%, or 44,400 adults currently have asthma (Figure 4). Furthermore, about 13.4% or 90,300 adults living in Honolulu County reported having asthma at some point in their lifetime (Appendix IV).

Figure 4. Percent of adults residing in Honolulu County who currently have asthma, BRFSS, 2002

Finding:
Figures 3 and 4 suggest that the Nanakuli/Waianae and Kaawa/Kahaluu/Kaneohe regions have higher rates of current asthma prevalence in both child and adult populations; however, this finding is not statistically significant (Appendix I, III)



	State	Hon Co.	A	B	C	D	E	F	G	H	I	J	K	L	M
% Current Adult Asthma	6.9	6.6	8.3	8.7	4.3	4.9	5.9	7.8	3.7	5.4	3.1	8.3	6.6	8.3	11.1

Current Asthma Prevalence – Hawaii County

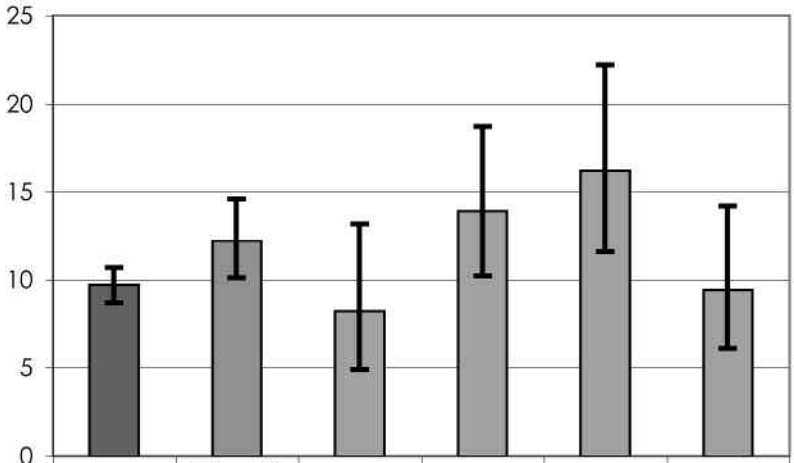
Children

In Hawaii County, about 12.2%, or 4,700 children are currently experiencing asthma (Figure 5).

Furthermore, about 18.1%, or 6,900 children reported having asthma at some point in their lifetime (Appendix II).

At about 16.2%, the Puna/Kau region has a higher prevalence rate (likely significant difference) of current childhood asthma when compared with the State at 9.7% (Figure 5).

Figure 5. Percent of children residing in Hawaii County who currently have asthma, BRFSS, 2002



	State	Hawaii County	A	B	C	D
% Current Childhood Asthma	9.7	12.2	8.2	13.9	16.2	9.4

Map Legend:

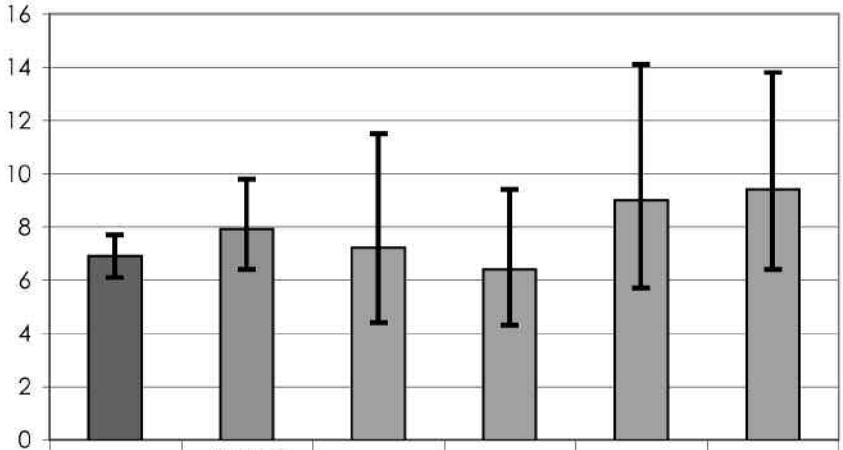
A. North Hawaii
B. Hilo
C. Puna/Kau
D. Kona

Adults

In Hawaii County, about 7.9%, or 9000 adults are currently experiencing asthma (Figure 6).

Furthermore, about 13.9%, or 15,900 adults reported having asthma at some point in their lifetime (Appendix IV).

Figure 6. Percent of adults residing in Hawaii County who currently have asthma, BRFSS, 2002



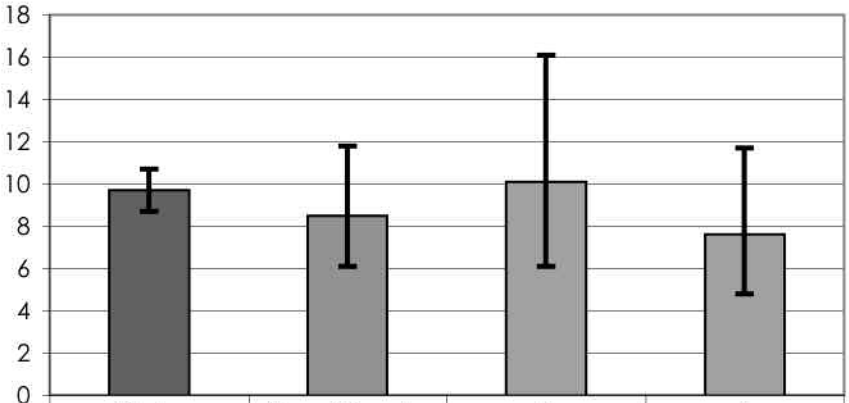
	State	Hawaii County	A	B	C	D
% Current Adult Asthma	6.9	7.9	7.2	6.4	9	9.4

Children

In Kauai County, about 8.5%, or 1,100 children are currently experiencing asthma (Figure 7).

Furthermore, about 15.9%, or 2,100 children reported having asthma at some point in their lifetime (Appendix II).

Figure 7. Percent of children residing in Kauai County who currently have asthma, BRFSS, 2002



	State	Kauai County	A	B
% Current Childhood Asthma	9.7	8.5	10.1	7.6

Map Legend:

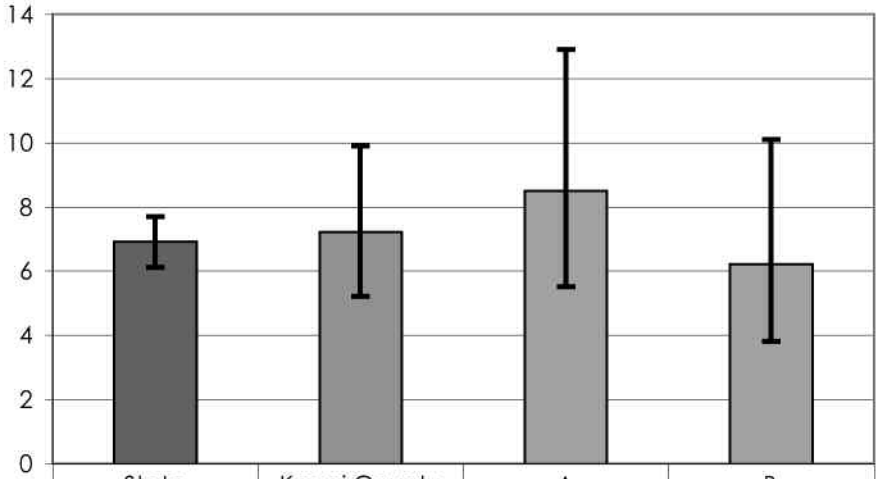
A. Hanalei/Kapaa
B. Lihue/Waimea

Adults

In Kauai County, about 7.2%, or 3,200 adults are currently experiencing asthma (Figure 8).

Furthermore, about 15.7%, or 7,000 adults reported having asthma at some point in their lifetime (Appendix IV).

Figure 8. Percent of adults residing in Kauai County who currently have asthma, BRFSS, 2002



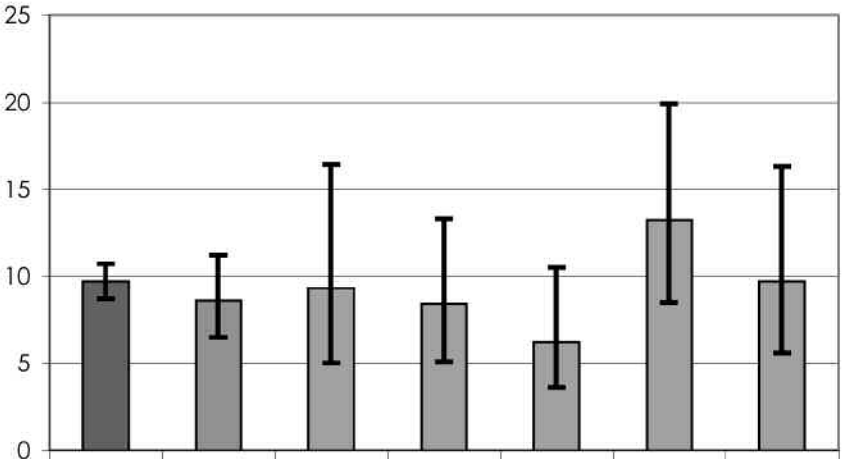
	State	Kauai County	A	B
% Current Adult Asthma	6.9	7.2	8.5	6.2

Children

In Maui County, about 8.6%, or 3,100 children are currently experiencing asthma (Figure 9).

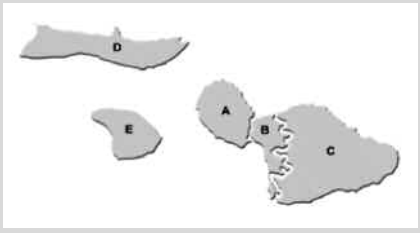
Furthermore, about 14%, or 5,000 children reported having asthma at some point in their lifetime (Appendix II).

Figure 9. Percent of children residing in Maui County who currently have asthma, BRFSS, 2002



	State	Maui County	A	B	C	D	E
% Current Childhood Asthma	9.7	8.6	9.3	8.4	6.2	13.2	9.7

Map Legend:



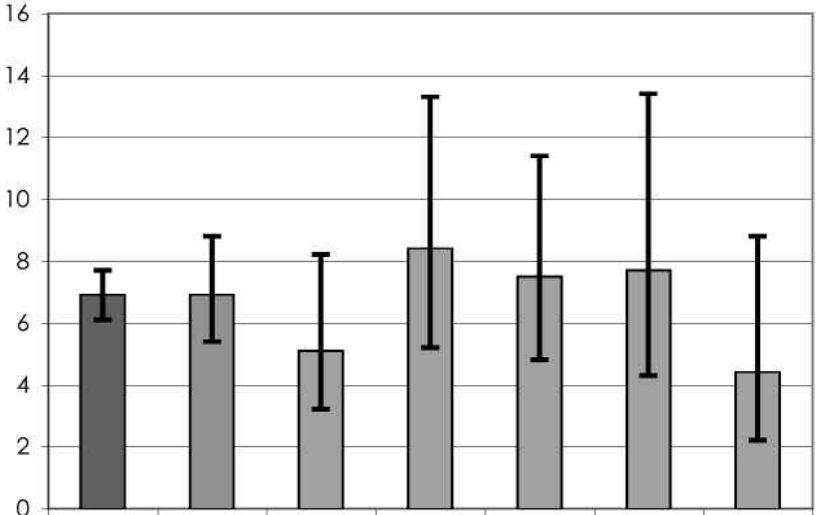
A. Lahaina/Wailuku
B. Kahului/Kihei
C. Upcountry/Hana
D. Molokai
E. Lanai

Adults

In Maui County, about 6.9%, or 6,900 adults are currently experiencing asthma (Figure 10).

Furthermore, about 12.3%, or 12,300 adults reported having asthma at some point in their lifetime (Appendix IV).

Figure 10. Percent of adults residing in Maui County who currently have asthma, BRFSS, 2002



	State	Maui County	A	B	C	D	E
% Current Adult Asthma	6.9	6.9	5.1	8.4	7.5	7.7	4.4

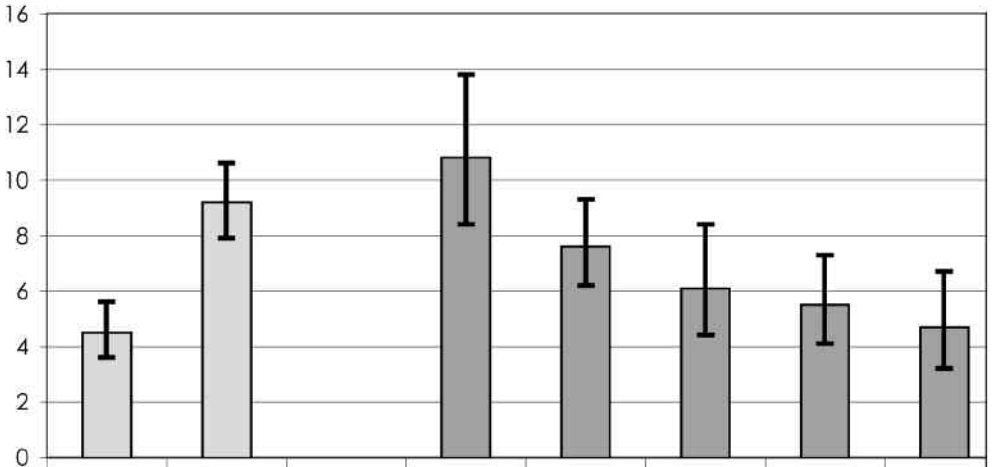
Current Asthma Prevalence by Gender, Ethnicity, & Age-Group (Adult)

Finding:
Figure 11 suggests that at 9.2%, adult females have a higher prevalence rate (likely significant difference) of current asthma when compared with adult males (4.5%).

When compared with the national average, both adult females and males in Hawaii have lower current asthma prevalence rates (U.S. adult females – 9.4%, U.S. adult males – 5.5%).

Adult Native Hawaiians have a higher prevalence rate (likely significant difference) of current asthma when compared with the Japanese and "Other" ethnic group.

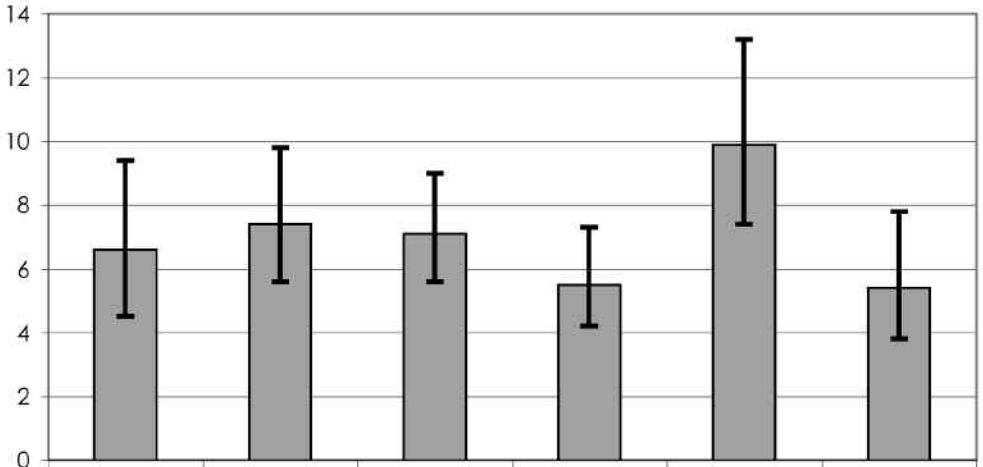
Figure 11. Percent of Hawaii's adults who currently have asthma by gender and ethnicity, BRFSS, 2002



	Male	Female		Hawaiian	White	Filipino	Japanese	Others
% Current Adult Asthma	4.5	9.2		10.8	7.6	6.1	5.5	4.7

Figure 12. Percent of Hawaii's adults who currently have asthma by age-group, BRFSS, 2002

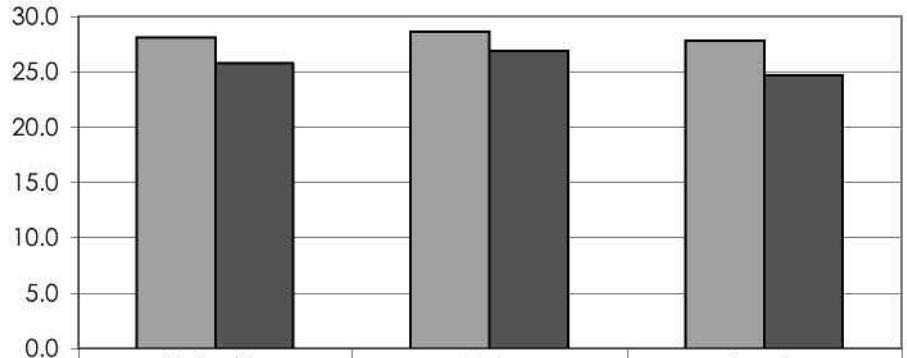
Finding:
Figure 12 suggests that adults, ages 55-64, have a higher prevalence rate (likely significant difference) of current asthma (9.9%) when compared with adults, ages 45-54 (5.5%).



	18-24 Years	25-34 Years	35-44 Years	45-54 Years	55-64 Years	65+ Years
% Current Adult Asthma	6.6	7.4	7.1	5.5	9.9	5.4

Figure 13. Weight status (BMI) among Hawaii's adults with and without current asthma by gender, BRFSS, 2002

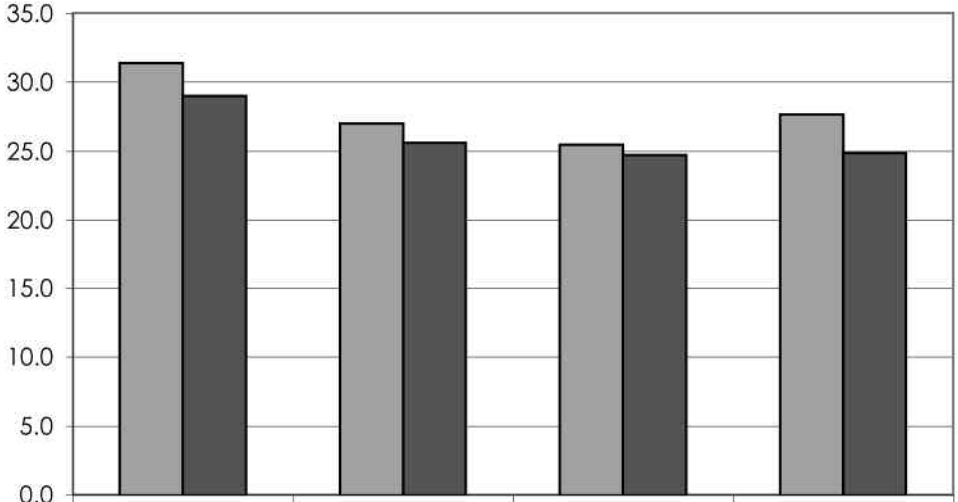
Finding:
Figure 13 suggests that, on average, adults with current asthma have a higher Body Mass Index (BMI) when compared with adults without asthma. This finding exists for both males and females and is statistically significant (Appendix V).



	Statewide	Male	Female
Mean BMI - Current Asthma	28.1	28.6	27.8
Mean BMI - No Current Asthma	25.8	26.9	24.7

Figure 14. Weight status (BMI) among Hawaii's adults with and without current asthma by ethnicity, BRFSS, 2002

Finding:
Figure 14 suggests that the association between current asthma and higher BMI is consistent across all four major ethnic groups and is statistically significant (Appendix V).



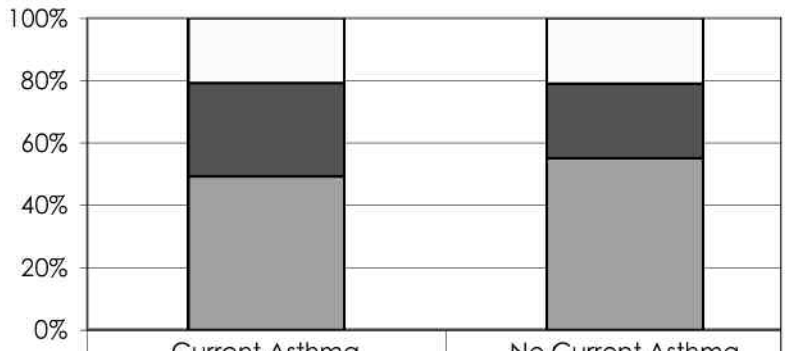
	Hawaiian	White	Japanese	Filipino
Mean BMI - Current Asthma	31.4	27.0	25.4	27.7
Mean BMI - No Current Asthma	29.0	25.6	24.7	24.9

Asthma & Smoking Status

Finding:
Figure 15 suggests that approximately 21% of adults, regardless of asthma status, are currently smokers. In fact, there are no significant differences between the smoking rates of adults with and without asthma (Appendix VI).

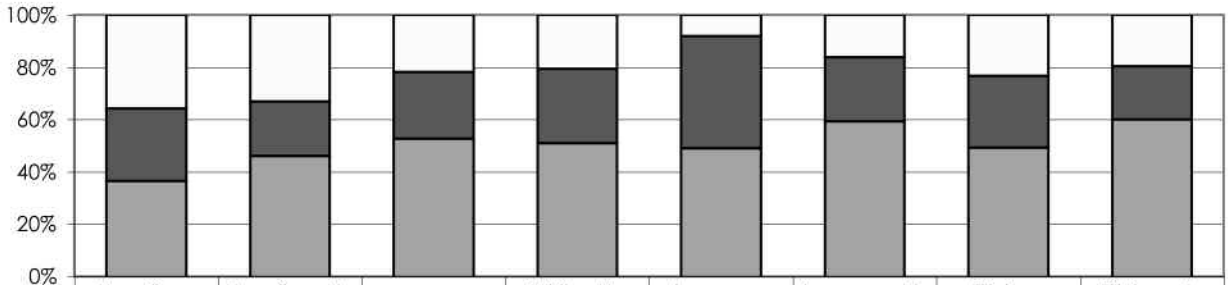
Adults with current asthma are more likely to be former smokers, and are less likely to have never smoked (Appendix VI).

Figure 15. Smoking among Hawaii's adults with and without current asthma, BRFSS, 2002



	Current Asthma	No Current Asthma
Current Smoker	20.8%	21.0%
Former Smoker	30.1%	23.8%
Never Smoked	49.1%	55.1%

Figure 16. Smoking status among Hawaii's adults with and without asthma by ethnicity, BRFSS, 2002



	Hawaiian - Current Asthma	Hawaiian - No Current Asthma	White - Current Asthma	White - No Current Asthma	Japanese - Current Asthma	Japanese - No Current Asthma	Filipino - Current Asthma	Filipino - No Current Asthma
Current Smoker	35.8%	33.2%	21.7%	20.7%	8.2%	16.1%	23.2%	19.6%
Former Smoker	27.6%	20.6%	25.7%	28.4%	42.7%	24.5%	27.6%	20.4%
Never Smoked	36.6%	46.2%	52.6%	50.9%	49.1%	59.4%	49.2%	59.9%

Finding:
Figure 16 suggests that among the four major ethnic groups, only Japanese adults with current asthma smoke at a lower rate than their ethnic counterparts without asthma.

Figure 17. Mean number of days with depressive symptoms (within a 30-day period) among Hawaii's adults with and without current asthma, BRFSS, 2002

Finding:
Figure 17 suggests that adults with current asthma felt sad, blue, or depressed an average of 2.97 days as opposed to 1.99 days for adults without current asthma (30-day period). This difference is statistically significant.

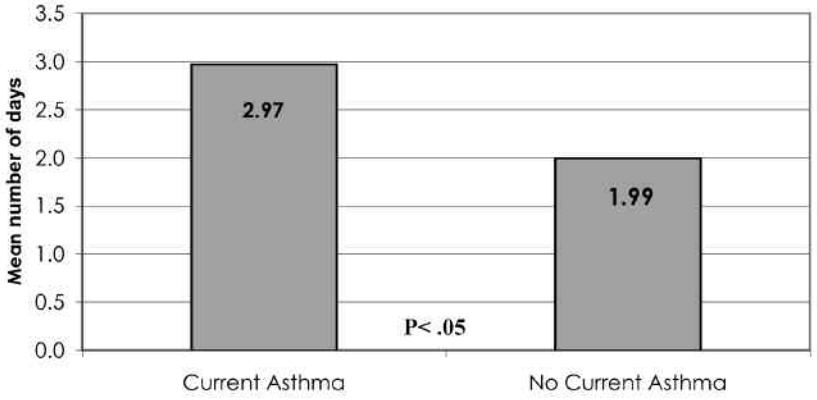
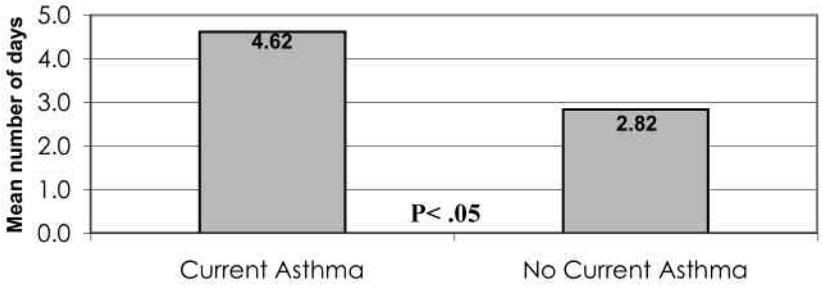


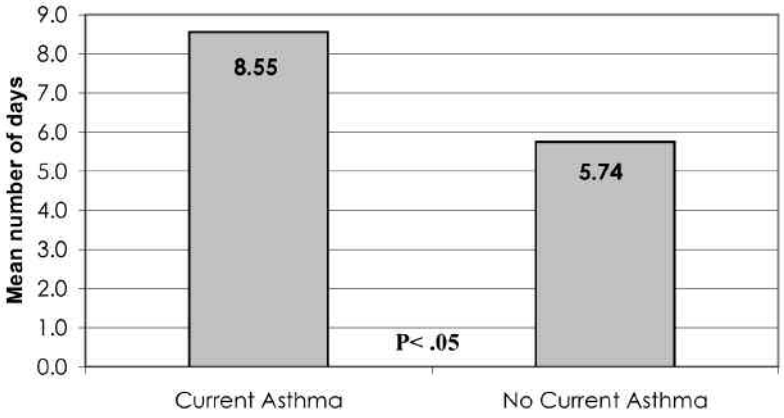
Figure 18. Mean number of days with anxiety symptoms (within a 30-day period) among Hawaii's adults with and without current asthma, BRFSS, 2002



Finding:
Figure 18 suggests that adults with current asthma felt worried, tense, or anxious an average of 4.62 days as opposed to 2.82 days for adults without current asthma (30-day period). This difference is statistically significant.

Figure 19. Mean number of days with rest/sleep disturbance (within a 30-day period) among Hawaii's adults with and without current asthma, BRFSS, 2002

Finding:
Figure 19 suggests that adults with current asthma felt they did not get enough rest/sleep an average of 8.55 days as opposed to 5.74 days for adults without current asthma (30-day period). This difference is statistically significant.

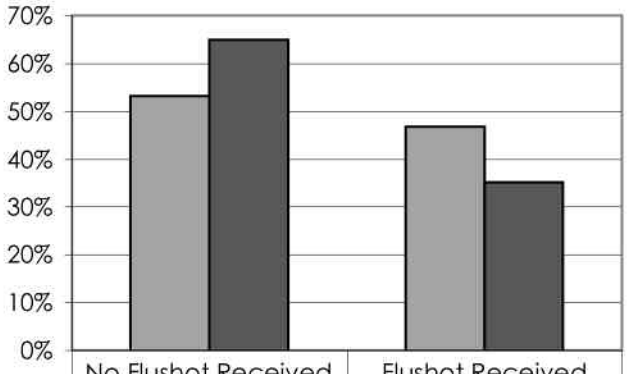


Finding:
Figure 20 suggests that in 2002, about 46.8% of adults with current asthma received their influenza vaccine as compared to 35.1% of adults without asthma.

Hawaii's influenza vaccine rates among adults with asthma are lower than the Healthy People 2010 goal of 60% (high-risk adults).

Adults with current asthma are 1.6 times more likely to receive their influenza vaccine when compared with adults without asthma (Appendix VII).

Figure 20. Influenza vaccine receipt among Hawaii's adults with and without current asthma, BRFSS, 2002



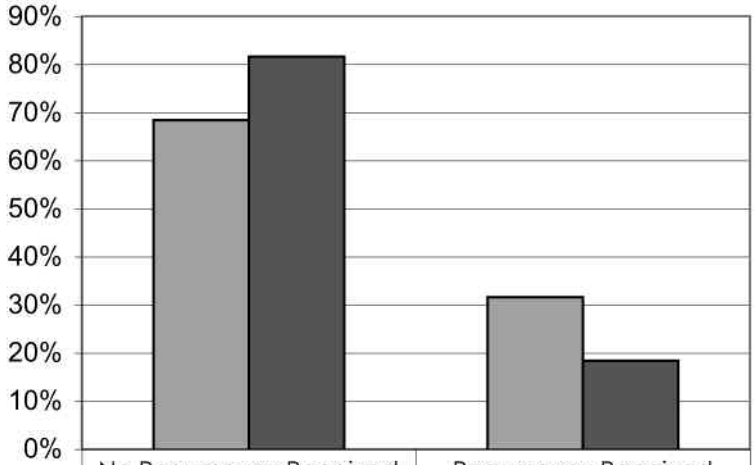
	No Flushot Received	Flushot Received
Current Asthma	53.2%	46.8%
No Current Asthma	64.9%	35.1%

Finding:
Figure 21 suggests that in 2002, about 31.6% of adults with current asthma received their pneumococcal pneumonia vaccine as compared to 18.4% of adults without asthma.

Even though adults with asthma are generally not considered high-risk for pneumococcal pneumonia, Hawaii's vaccine rates among adults with asthma are lower than the Healthy People 2010 goal of 60% (high-risk adults)

Adults with current asthma are 2.2 times more likely to receive their pneumococcal pneumonia vaccine when compared with adults without asthma (Appendix VII).

Figure 21. Pneumococcal pneumonia vaccine receipt among Hawaii's adults with and without current asthma, BRFSS, 2002



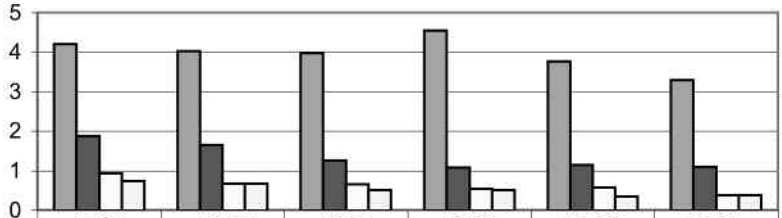
	No Pneumovax Received	Pneumovax Received
Current Asthma	68.4%	31.6%
No Current Asthma	81.6%	18.4%

Childhood Asthma Hospitalizations

Finding:
The majority of hospitalizations related to asthma between the ages of 0-19 are occurring in children under the age of five (Appendix VIII). The Hawaii 2001 asthma hospitalization rate for children under five (3.29/1000) is higher than the Healthy People 2010 goal of 2.5/1000.

There is a significant overall downward trend in childhood asthma hospitalization rates (1996 to 2001), except within the under five age-group (Appendix X).

Figure 22. Hawaii asthma hospitalizations* per 1000 population, ages 0-19, 1996 – 2001



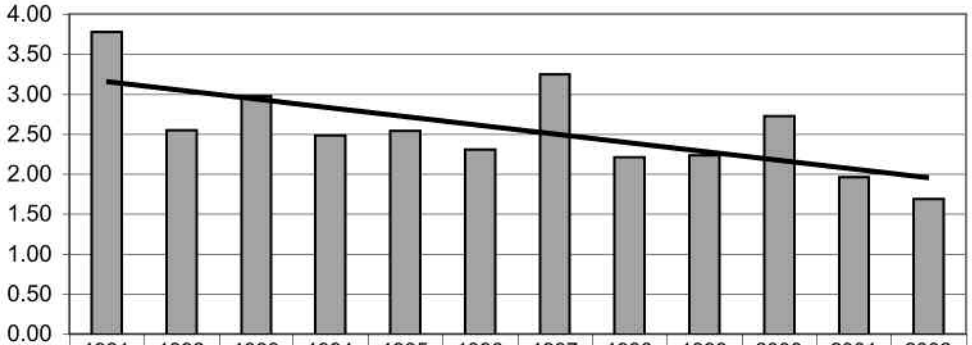
	1996	1997	1998	1999	2000	2001
Under 5 years of age	4.2	4.02	3.97	4.55	3.76	3.29
5 to 9 years of age	1.87	1.65	1.25	1.07	1.14	1.09
10 to 14 years of age	0.93	0.67	0.65	0.54	0.57	0.38
15 to 19 years of age	0.73	0.66	0.51	0.51	0.35	0.37

* Asthma defined by primary ICD9 codes 493.xx. Hawaii residents only. Excludes newborns, pregnancy-related admissions and patients admitted through a transfer from another facility.
Data Source: Hawaii Health Information Corporation
Rates calculated by the Hawaii State Asthma Control Program

Asthma Mortality

Finding:
There is a significant overall downward trend in asthma mortality rates between the years 1991 – 2002 (Appendix X). However, Hawaii's asthma mortality rate is higher than the U.S. average (2.72/100,000 versus 1.59/100,000) for year 2000 (Appendix IX).

Figure 23. Hawaii asthma mortality* per 100,000 population, 1991 to 2002



	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Asthma Deaths per 100,000 Population	3.77	2.55	2.97	2.48	2.54	2.30	3.25	2.21	2.23	2.72	1.96	1.69

* The Estimated Comparability Ratio was used to allow comparisons to be made across all years.
Asthma mortality defined as asthma as an underlying cause of death.
Data Source: Office of Health Status Monitoring, Hawaii State Department of Health
Rates calculated by the Hawaii State Asthma Control Program

Appendix I: Hawaii Childhood Current Asthma Prevalence, BRFSS, 2002

Region	Current Asthma Prevalence	Lower Confidence Interval	Upper Confidence Interval	Estimated Number of children with current asthma
State	9.7	8.7	10.7	28583
COUNTY				
Honolulu	9.5	8.2	10.9	19775
Hawaii	12.2	10.1	14.6	4647
Kauai	8.5	6.1	11.8	1092
Maui	8.6	6.5	11.2	3059
HONOLULU COUNTY				
North Shore	11.3	4.8	24.3	622
Kaawa/Kahaluu/Kaneohe	15.3	9.8	23	1898
Kailua/Waimanalo	6.2	3.2	11.8	857
Waialae/Kahala/Hawaii Kai	11.5	7.2	17.9	1661
Kaimuki/Palolo/Waikiki	10.2	6.2	16.3	1299
Manoa/Upper Makiki	6.8	3.3	13.7	642
Ala Moana/Lower Makiki	9.7	4.9	18.3	848
Nuuanu/Kalihi/Moanalua	10.3	6.6	15.7	2020
Salt Lake/Foster Village	5.5	2.7	10.8	785
Aiea/Pearl City	10.6	6.7	16.4	1812
Mililani/Wahiawa	8.8	5.9	12.8	2365
Waipahu/Kapolei/Ewa	7.5	5.1	10.7	2777
Nanakuli/Waianae	13.2	8.4	20.2	2140
HAWAII COUNTY				
North Hawaii	8.2	4.9	13.2	597
Hilo	13.9	10.2	18.7	1661
Puna/Kau	16.2	11.6	22.2	1448
Kona	9.4	6.1	14.2	933
KAUAI COUNTY				
Hanalei/Kapaa	10.1	6.1	16.1	509
Lihue-Waimea	7.6	4.8	11.7	593
MAUI COUNTY				
Lahaina/Wailuku	9.3	5	16.4	1038
Kahului	8.4	5.1	13.3	799
Upcountry/Hana	6.2	3.6	10.5	618
Molokai	13.2	8.5	19.9	496
Lanai	9.7	5.6	16.3	113

Appendix II: Hawaii Childhood Lifetime Asthma Prevalence, BRFSS, 2002

Region	Childhood Lifetime Prevalence (%)*	Estimated number of children with a history of having asthma at some point in their lifetime
State	14.1	41549
COUNTY		
Honolulu	13.3	27686
Hawaii	18.1	6894
Kauai	15.9	2043
Maui	14	4980
HONOLULU COUNTY		
North Shore	16.7	919
Kaawa/Kahaluu/Kaneohe	19.4	2406
Kailua/Waimanalo	7.7	1064
Waialae/Kahala/Hawaii Kai	21.1	3048
Kaimuki/Palolo/Waikiki	12.5	1593
Manoa/Upper Makiki	17.2	1624
Ala Moana/Lower Makiki	14.1	1233
Nuuanu/Kalihi/Moanalua	12.2	2392
Salt Lake/Foster Village	6.1	870
Aiea/Pearl City	12.7	2171
Mililani/Wahiawa	14	3762
Waipahu/Kapolei/Ewa	10.7	3961
Nanakuli/Waianae	15.7	2545
HAWAII COUNTY		
North Hawaii	12.2	888
Hilo	22.3	2665
Puna/Kau	20.5	1832
Kona	15	1488
KAUAI COUNTY		
Hanalei/Kapaa	15.4	776
Lihue-Waimea	16.3	1272
MAUI COUNTY		
Lahaina/Wailuku	14.1	1574
Kahului	16.5	1570
Upcountry/Hana	10.6	1057
Molokai	17	639
Lanai	12.6	146

* Confidence intervals were not calculated for child lifetime asthma prevalence.

Appendix III: Hawaii Adult Current Asthma Prevalence, BRFSS, 2002

Region	Current Asthma Prevalence	Lower Confidence Interval	Upper Confidence Interval	Estimated Number of adults with current asthma
State	6.9	6.1	7.7	64306
COUNTY				
Honolulu	6.6	5.6	7.8	44468
Hawaii	7.9	6.4	9.8	9012
Kauai	7.2	5.2	9.9	3202
Maui	6.9	5.4	8.8	6877
HONOLULU COUNTY				
North Shore	8.3	3.9	16.7	1642
Kaawa/Kahaluu/Kaneohe	8.7	4.9	14.9	3550
Kailua/Waimanalo	4.3	2.3	7.9	2075
Waialae/Kahala/Hawaii Kai	4.9	2.5	9.4	2318
Kaimuki/Palolo/Waikiki	5.9	3.8	9.2	4135
Manoa/Upper Makiki	7.8	4.8	12.6	4598
Ala Moana/Lower Makiki	3.7	1.5	8.8	1265
Nuuanu/Kalihi/Moanalua	5.4	2.8	10.1	3616
Salt Lake/Foster Village	3.1	1.3	7.1	1180
Aiea/Pearl City	8.3	5.2	12.9	5594
Mililani/Wahiawa	6.6	3.2	12.9	4269
Waipahu/Kapolei/Ewa	8.3	5.6	12.3	7516
Nanakuli/Waianae	11.1	6.4	18.5	2963
HAWAII COUNTY				
North Hawaii	7.2	4.4	11.5	1667
Hilo	6.4	4.3	9.4	2277
Puna/Kau	9	5.7	14.1	2196
Kona	9.4	6.4	13.8	2908
KAUAI COUNTY				
Hanalei/Kapaa	8.5	5.5	12.9	1626
Lihue-Waimea	6.2	3.8	10.1	1572
MAUI COUNTY				
Lahaina/Wailuku	5.1	3.2	8.2	1557
Kahului	8.4	5.2	13.3	2419
Upcountry/Hana	7.5	4.8	11.4	2182
Molokai	7.7	4.3	13.4	588
Lanai	4.4	2.2	8.8	159

Appendix IV

Appendix IV: Hawaii Adult Lifetime Asthma Prevalence, BRFSS, 2002

Region	Adult Lifetime Prevalence (%)	Lower Confidence Interval	Upper Confidence Interval	Estimated number of adults with a history of having asthma at some point in their lifetime
State	13.4	12.3	14.6	124884
COUNTY				
Honolulu	13.4	11.9	14.9	90283
Hawaii	13.9	11.8	16.4	15857
Kauai	15.7	12.5	19.7	6983
Maui	12.3	10.4	14.6	12259
HONOLULU COUNTY				
North Shore	12.5	6.5	22.7	2473
Kaawa/Kahaluu/Kaneohe	14.2	9	21.5	5795
Kailua/Waimanalo	8.4	5.2	13.2	4053
Waialae/Kahala/Hawaii Kai	10.3	6.4	16.3	4872
Kaimuki/Palolo/Waikiki	12.1	8.8	16.4	8480
Manoa/Upper Makiki	14.8	10.4	20.8	8725
Ala Moana/Lower Makiki	11.8	7.3	18.6	4036
Nuuanu/Kalihi/Moanalua	17.3	12.2	24	11585
Salt Lake/Foster Village	8.5	5.1	13.8	3235
Aiea/Pearl City	15.0	10.6	20.7	10110
Mililani/Wahiawa	14.3	9.3	21.4	9251
Waipahu/Kapolei/Ewa	14.6	10.8	19.3	13221
Nanakuli/Waianae	15.4	9.6	23.9	4111
HAWAII COUNTY				
North Hawaii	14.1	9.3	20.9	3265
Hilo	15.8	12.1	20.4	5622
Puna/Kau	11.5	7.7	16.9	2806
Kona	13.6	10	18.2	4208
KAUAI COUNTY				
Hanalei/Kapaa	16.5	11.7	22.8	3175
Lihue-Waimea	15.1	11	20.5	3828
MAUI COUNTY				
Lahaina/Wailuku	12.2	8.9	16.5	3724
Kahului	12.0	8.4	17.1	3456
Upcountry/Hana	12.0	8.6	16.5	3491
Molokai	14.2	9.2	21.2	1085
Lanai	14.6	9.7	21.4	528

Appendix V: Hawaii Mean Weight Status (BMI) of Adults With and Without Current Asthma by Gender and Ethnicity, BRFSS, 2002

	Mean Difference	Lower CI	Upper CI
Statewide	2.3*	2.2	2.3
Male	1.7*	1.6	1.8
Female	3.2*	3.1	3.2
Native Hawaiian	2.4*	2.2	2.5
White	1.4*	1.3	1.5
Japanese	0.8*	0.7	0.8
Filipino	2.8*	2.7	2.9

* Statistically Significant

Appendix VI: Hawaii Smoking Prevalence Rates Among Adults With and Without Asthma, BRFSS, 2002

	% Current Smoker	Lower CI	Upper CI
Current Asthma	20.8%	20.5%	21.1%
No Asthma	21.0%	21.0%	21.1%

	% Former Smoker	Lower CI	Upper CI
Current Asthma	30.1%*	29.7%	30.5%
No Asthma	23.8%*	23.8%	23.9%

	% Never Smoked	Lower CI	Upper CI
Current Asthma	49.1%*	48.7%	49.5%
No Asthma	55.1%*	55.0%	55.2%

* Statistically Significant

Appendix VII: Odds Ratios for Hawaii Immunization Rates by Current Asthma Status, BRFSS, 2002

	Odds Ratio	Lower CI	Upper CI
Influenza Vaccine Receipt	1.6*	1.56	1.61
Pneumoncoccal Pneumonia Vaccine Receipt	2.2*	2.12	2.202

* Statistically Significant

Appendix VIII: Hawaii Childhood Asthma Hospitalization Rates, 1996-2001

Age Group		1996	1997	1998	1999	2000	2001
Under 5 years	Number of hospitalizations*	383	356	334	366	294	265
	Total estimated population**	91,264	88,472	84,095	80,387	78,163	80,433
	Hospitalization rate/ 1,000 population	4.20	4.02	3.97	4.55	3.76	3.29
5 to 9 years	Number of hospitalizations*	163	144	110	92	97	89
	Total estimated population**	86,975	87,499	88,186	86,229	84,980	81,932
	Hospitalization rate/ 1,000 population	1.87	1.65	1.25	1.07	1.14	1.09
10 to 14 years	Number of hospitalizations*	75	53	51	41	47	32
	Total estimated population**	80,917	78,822	77,912	75,914	83,106	83,786
	Hospitalization rate/ 1,000 population	0.93	0.67	0.65	0.54	0.57	0.38
15 to 19 years	Number of hospitalizations*	59	54	43	42	28	31
	Total estimated population**	80,990	81,698	83,504	82,664	81,002	83,676
	Hospitalization rate/ 1,000 population	0.73	0.66	0.51	0.51	0.35	0.37

* Data Source: Hawaii Health Information Corporation
Asthma hospitalizations with a primary diagnosis of 493xx.
Excludes newborns, pregnancy-related admissions, and transfers from another facility

** Data Source: Department of Business, Economic Development, and Tourism, State of Hawaii

Appendix IX: Hawaii Asthma Mortality Rates, 1991-2002

Year	Total asthma deaths*	Total asthma deaths**	Total estimated population***	Total asthma deaths/100,000 population
1991	48	42.9024	1,136,754	3.77
1992	33	29.4954	1,158,613	2.55
1993	39	34.8582	1,172,838	2.97
1994	33	29.4954	1,187,536	2.48
1995	34	30.3892	1,196,854	2.54
1996	31	27.7078	1,203,755	2.30
1997	44	39.3272	1,211,640	3.25
1998	30	26.814	1,215,233	2.21
1999	27	27	1,210,300	2.23
2000	33	33	1,212,670	2.72
2001	24	24	1,227,024	1.96
2002	21	21	1,244,898	1.69

* Data Source: Office of Health Status Monitoring, Hawaii State Department of Health Asthma as an underlying cause of mortality

** Estimated Comparability Ratio [.8938] used for years 1991 to 1998

*** Data Source: Department of Business, Economic Development, and Tourism, State of Hawaii

Appendix X: Hawaii Trends in Childhood Asthma Hospitalization Rates (1996-2001) and Asthma Mortality Rates (1991-2002)

Childhood Hospitalizations	Pearson's Correlation Coefficient
Under 5 Years of Age, 1996 – 2001	-0.60
5 to 9 Years of Age, 1996 – 2001	-0.90*
10 to 14 Years of Age, 1996 – 2001	-0.93*
15 to 19 Years of Age, 1996 – 2001	-0.96*
Asthma Mortality	
1991 – 2002	-0.69*

* Statistically Significant

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Asthma Prevalence

Prevalence is the number of existing cases of a disease present in a population (or the proportion of individuals in a population who have a disease) at a specific time.

Adult Lifetime Asthma Prevalence is defined by the Hawaii Behavioral Risk Factor Surveillance System (BRFSS) as those who responded "yes" to the question, " Have you ever been told by a doctor, nurse, or other health professional that you had asthma?"

Adult Current Asthma Prevalence is defined by the Hawaii BRFSS as those who responded "yes" to the Adult Lifetime Asthma Prevalence question, and who responded "yes" to the question, "Do you still have asthma?"

Child Lifetime Asthma Prevalence is defined by the Hawaii BRFSS by asking this question to adult respondents with children in the home: "Earlier you said there were [ ] children 17 or younger living in your household. How many of these children have ever been diagnosed with asthma?"

Child Current Asthma Prevalence is defined by the Hawaii BRFSS by asking adult respondents who reported having children in the household that have been diagnosed as "ever" having asthma the following question: "Does this child/how many of these children still have asthma?"

Community

Communities (sub-county geographic regions) in this report are defined by the aggregation of adjacent zip codes with at least one school complex in the region. A list of the community zip codes can be found at the web site: www.state.hi.us/doh/stats/surveys/2001/subarea.html

Ethnicity

Respondents are asked to choose one race from the race list to answer the question: "What is your race?" The race list includes Caucasian, Hawaiian, Chinese, Filipino, Japanese, Korean, Samoan, Black, American Indian/Alaska native/Eskimo/Inuit, Vietnamese, Asian Indian, Portuguese, Guamanian/Chamorro, Puerto Rican, Mexican, Tongan, Laotian, Cambodian, Malaysian, Fijian, Micronesian, and other Asian. In addition, a respondent can specify their own ethnicity if it is not listed, or they can say they don't know, they are not sure, or they refuse to answer. For simplicity, this document re-categorizes race/ethnicity into White (includes Portuguese), Hawaiian, Filipino, Japanese, and "Others" (includes Chinese).

Immunization

The Hawaii BRFSS defines influenza vaccine receipt as those adults responding "yes" to the question, "During the past 12 months, have you had a flu shot?"

The Hawaii BRFSS defines pneumococcal pneumonia vaccine receipt as those adults responding "yes" to the question, " Have you ever had a pneumonia shot? This shot is usually given only once or twice in a person's lifetime and is different from the flu shot. It is called the pneumonia vaccine."

Hospitalization

An asthma hospitalization is defined as a hospitalization (Hawaii residents only) with a primary diagnosis of 493.xx (ICD.9). The definition excludes newborns, pregnancy-related admissions and patients admitted through a transfer from another facility.

Mortality

The **Mortality Rate** expresses the number of deaths occurring in a particular population during a given period of time.

The **Underlying Cause of Death** (UCD) is the disease/condition that initiated the train of events leading to death.

Contributory Causes of Death are diseases/conditions that did not initiate the train of events leading to death, but resulted in death directly or indirectly; or any other significant conditions which unfavorably influenced the course of the morbid process and thus contributed to the fatal outcome.

Weight Status

Body Mass Index (BMI) is used to define obesity in this report. BMI is defined as weight in kilograms divided by the square of height in meters (kg/m2). Based on federal guidelines, bodyweight is categorized by BMI as follows:

Not Overweight/Obese:	BMI < 25.0
Overweight:	25.0 < BMI < 30.
Obese:	BMI > 30.0

Smoking Status

The Hawaii BRFSS defines a current smoker as a person who responds "yes" to currently smoking every day or some days.

The Hawaii BRFSS defines a former smoker as a person who has smoked at least 100 cigarettes in their lifetime, but no longer smokes.

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Hawaii State Department of Health

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